

## CLAIMS

1. A plant controller using a modulation algorithm, the controller comprising:
  - 5 means for providing a preliminary control input to be used for controlling an output of the plant to a desired value;
  - means for dividing the preliminary control input into a plurality of components;
  - means for modulating at least one of the plurality of components;
  - 10 and
  - means for adding the modulated component to the other components to generate a control input.
2. The plant controller as claimed in claim 1, wherein said plurality of  
15 components include:
  - a first component extracted by filtering the preliminary control input; and
  - a second component extracted from a difference between the preliminary control input and the first component, said second component  
20 being within a predetermined range of absolute values; and
  - wherein said means for modulating modulates the second component.
3. The plant controller as claimed in claim 1, wherein said means for  
25 modulating uses an algorithm selected from a group comprising a  $\Delta\Sigma$  modulation algorithm, a  $\Sigma\Delta$  modulation algorithm and a  $\Delta$  modulation algorithm.
4. The plant controller as claimed in claim 2, wherein said filtering is  
30 performed by a linear filter or a median filter.

5. The plant controller as claimed in claim 4, wherein said filtering is further performed by a  $\varepsilon$  filter.

5 6. The plant controller as claimed in claim 2, wherein said filtering is performed by a  $\varepsilon$  filter.

7. A controller for a variable lift mechanism of an internal-combustion engine, the controller using a modulation algorithm and comprising:

10       means for providing a preliminary control input to be used for controlling a maximum lift amount of the variable lift mechanism to a desired lift amount;

          means for dividing the preliminary control input into a plurality of components;

15       means for modulating at least one of the plurality of components; and

          means for adding the modulated component to the other components to generate a control input.

20 8. A controller for a variable phase mechanism of an internal-combustion engine, the controller using a modulation algorithm and comprising:

          means for providing a preliminary control input to be used for controlling a cam phase of the variable phase mechanism to a desired phase;

25       means for dividing the preliminary control input into a plurality of components;

          means for modulating at least one of the plurality of components; and

30       means for adding the modulated component to the other components to generate a control input.

9. An air/fuel ratio controller of an internal-combustion engine, the controller using a modulation algorithm and comprising:
- means for providing a preliminary control input to be used for
  - 5 controlling an output of an exhaust gas sensor on a desired value;
  - means for dividing the preliminary control input into a plurality of components;
  - means for modulating at least one of the plurality of components;
  - and
  - 10 means for adding the modulated component to the other components to generate a control input.
10. A controller for an automatic transmission mechanism of an internal-combustion engine, the controller using a modulation algorithm
- 15 and comprising:
- means for providing a preliminary control input to be used for controlling an output position of the automatic transmission mechanism on a desired position;
  - means for dividing the preliminary control input into a plurality of
  - 20 components;
  - means for modulating at least one of the plurality of components;
  - and
  - means for adding the modulated component to the other components to generate a control input.
- 25
11. A method for controlling a plant, comprising:
- providing a preliminary control input to be used for controlling an output of the plant to a desired value;
  - dividing the preliminary control input into a plurality of
  - 30 components;

modulating at least one of the plurality of components; and  
adding the modulated component to the other components to  
generate a control input.

- 5 12. The method of claim 11, wherein said plant is an internal combustion engine.